ROCKY FLATS PLANT

4-15310-IHPM-5.2

Revision 0

BERYLLIUM CONTROL PROGRAM

APPROVED BY: Michael W. [signature], 3/25/92
Manager, Industrial Hygiene Date

Responsible Organization: Industrial Hygiene

Effective Date: 03/27/92

CONCURRENCE:

R. C. [signature], 3-24-92
Manager, Safety & Hygiene Date

[signature], 3/24/92
Subject Matter Expert Date

AFFECTS PLANT SAFETY
PROCEDURE USE CATEGORY 3

Reviewed for Classification
By: G. S. Hyatt -U-
Date 3-23-92

TABLE OF CONTENTS

1. PURPOSE

1.1 This procedure describes how Industrial Hygiene (IH) shall administer the Beryllium Control Program at the Rocky Flats Plant (RFP) to ensure uniform, consistent requirements for all RFP personnel working with various quantities of beryllium and beryllium compounds. In addition, this procedure shall help ensure that all exposures are being maintained at As Low As Reasonably Achievable (ALARA) and comply with 29 Code of Federal Regulations (CFR) 1910.1000, Department of Energy (DOE) Order 5480.10, and Health and Safety Practices (HSP) 13.03, Carcinogen Control and 13.04, Beryllium Protection.

2. SCOPE

2.1 This procedure applies to all Beryllium Operations and Beryllium Support Operations at RFP. This procedure shall cover the following activities:

1. Identification of Operations involving Beryllium
2. Work Practice Controls for Operations involving Beryllium
3. Types of Beryllium Sampling

3. DEFINITIONS

3.1 ALARA. A term referring to the control of contaminants to levels that are as low as can be achieved through practical methods.

3.2 Airhead Sample. An area air sample that is collected from a permanently fixed location within a Beryllium Regulated Area. These samplers operate 24 hours a day and seven days a week.

3.3 Action Level. An airborne concentration below which Industrial Hygiene is trying to maintain all employee exposures. For all contaminants, except for beryllium, the action level is one half the

established exposure value. The action level for beryllium is one quarter of the exposure value, 0.0005 milligrams per cubic meter (mg/m^3).

3.4 Area Air Sample. A sample that is collected from a fixed location within the work area.

3.5 Assumed Worst Case Situation. The assumed worst case situations are considered those operations or parts of operations which are likely to generate the largest quantities of contaminants.

3.6 Baseline Sampling. A set of samples that are initially collected to characterize a particular process.

3.7 Beryllium. Any metal or compound with a beryllium content greater than 0.1% beryllium.

3.8 Beryllium Operations. Any operation involving the use of compounds greater than 0.1% beryllium where there is potential for airborne beryllium particles to exceed 0.0005 mg/m^3.

3.9 Beryllium Regulated Area. A regulated area is established for all operations that have potential for airborne beryllium particles. These areas can be temporary or permanent depending upon the job, and they are established in accordance with the Carcinogen Control Program.

3.10 Beryllium Support Operations. Those areas handling beryllium where there is little risk of contact with airborne beryllium particles, but which are monitored routinely by Industrial Hygiene.

3.11 Beryllium Support Worker. A worker who has little risk of contact with airborne beryllium particles, but who does come in contact with beryllium in a manner that requires Industrial Hygiene overview.

3.12 Beryllium Worker. A worker who has a high or moderate risk of contact with beryllium particles. The worker meets the following criteria:

1. Any worker whose 8-hour breathing zone sample results reflect the presence of airborne beryllium particles in excess of 0.0005 mg/m^3; or
2. Any worker who works in an occupation where breathing zone samples for airborne beryllium particles have the potential to exceed 0.0005 mg/m^3.

3.13 Breathing Zone Air Sample. A sample that is collected within an individual's breathing zone. This may be accomplished by either the individual wearing the sampling device or having a second individual holding the sampling device in the worker's breathing zone.

3.14 Occupational Safety and Health Administration's (OSHA) Beryllium Permissible Exposure Limit (PEL). OSHA's PEL for beryllium has three elements limiting airborne beryllium particles in the breathing zone to:

1. 0.002 mg/m^3 for any 8 hour workshift of a 40 hour work week.
2. 0.005 mg/m^3 as an acceptable ceiling concentration except for the time period and concentration defined on the acceptable maximum peak (see item 3).
3. 0.025 mg/m^3 as an acceptable maximum peak above the acceptable ceiling concentration for a maximum of 30 minutes.

3.15 Smear Sample. A sample collected by smearing a dry Whatman 41 filter paper across a square foot (ft^2) of surface. The RFP standard for beryllium surface contamination is 25 micrograms (ug) per ft^2.

4. RESPONSIBILITIES

4.1 The IH Manager is responsible for the following activities:

4.1.1 Designate a Beryllium Control Program Administrator for the department.

4.1.2 Provide technical guidance to IH staff on an as needed basis.

4.2 The Beryllium Control Program Administrator is responsible for the following activities:

4.2.1 Provide technical guidance to IH staff regarding beryllium on an as needed basis.

4.2.2 Provide overall guidance for the Beryllium Control Program.

4.2.3 Review all beryllium sampling data collected.

4.2.4 Ensure that the Beryllium Operations and Beryllium Support Operations Inventory is maintained up to date.

4.2.5 Periodically review the adequacy of controls within Beryllium Regulated Areas.

4.2.6 Notify the user whenever an airhead sample exceeds the action level or a smear sample exceeds 25 ug/ft^2.

4.2.7 Periodically review the Beryllium Operations computer based training (CBT) program and update as necessary.

4.2.8 Identify beryllium sample locations and establish a sampling frequency.

4.2.9 Recommend new policies and procedures to maintain worker protection and to minimize exposure potential.

4.2.10 Address employee concerns regarding beryllium.

4.3 Industrial Hygienists are responsible for the following activities:

4.3.1 Notify the Beryllium Control Program Administrator of issues involving beryllium within their buildings of responsibility.

4.3.2 Submit any beryllium sampling data to the Beryllium Control Program Administrator for review at the completion of the sampling project.

4.4 IH Technicians are responsible for entering all beryllium airhead and smear sample data into a beryllium sample log book.

4.5 Radiation Protection Technologists (RPT) matrixed to IH are responsible for the following activities:

4.5.1 Collect airhead samples.

4.5.2 Collect smear samples.

4.5.3 Calibrate the Beryllium Activated Swipe Tester (BeAST).

4.5.4 Analyze smear samples on the BeAST.

5. INSTRUCTIONS

5.1 Identification of Operations Involving Beryllium

5.1.1 All operations involving beryllium shall be identified with the assistance from the user, Engineering, and Procurement.

5.1.2 Once operations involving beryllium have been identified, a process review for each of those operations shall be completed in accordance with IH procedure 4-15310-IHPM-3.2, Industrial Hygiene Process Review Form.

5.1.3 The completed process review shall be given a priority rating. These ratings range from 1 to 4 and are as follows:

1. Priority 1 indicates the operation has a high potential for airborne beryllium particles to exceed 0.0005 mg/m^3.
2. Priority 2 indicates the operation has a moderate potential for airborne beryllium particles to exceed 0.0005 mg/m^3.
3. Priority 3 indicates the operation has a low potential for airborne beryllium particles to exceed 0.0005 mg/m^3.
4. Priority 4 indicates the operation has no potential for airborne beryllium particles.

5.1.4 Operations identified as priority 1 and 2 shall be classified as a Beryllium Operation.

5.1.5 Operations identified as Priority 3 and 4 shall be classified as a Beryllium Support Operation.

5.1.6 Each of these operations shall then be incorporated into a Beryllium Operations Inventory and a Beryllium Support Operations Inventory.

5.1.7 Employees identified as working on a Beryllium Operation shall be classified as Beryllium Workers.

5.1.8 Beryllium Workers shall be identified to Occupational Health as requiring Medical Surveillance.

5.1.9 Employees identified as working on a Beryllium Support Operation shall be classified as Beryllium Support Workers.

5.2 Work Practice Controls for Operations Involving Beryllium

5.2.1 All Beryllium Workers, Beryllium Support Workers, and unescorted visitors shall successfully complete the Beryllium Operations CBT course biannually.

5.2.2 A Beryllium Regulated Area will be established for all operations that have a priority 1 or 2.

5.2.3 Any person entering a Beryllium Regulated Area shall wear company furnished clothing as required for that particular area.

5.2.4 Before any equipment, material, or tools are removed from a Beryllium Regulated Area, they will be cleaned and have a surface contamination level less than (<) 25 ug/ft^2.

5.2.5 Clean-up shall only be done with High Efficiency Particulate Air (HEPA) filtered vacuum cleaners and/or wet mopping or wiping.

5.2.6 Food preparation, storage, eating, drinking, smoking, and chewing tobacco are prohibited in all areas that handle beryllium.

5.2.7 Compressed air is not to be used to clean any beryllium part or any surface in a Beryllium Regulated Area.

5.2.8 Engineering controls shall be the primary means of controlling airborne beryllium particles and they shall be inspected in accordance with IH procedure 4-15310-IHPM-4.3, Ventilation Control.

5.2.9 Operations involving beryllium shall have workplace controls identified by an Operational Safety Analysis (OSA) or approved procedure for routine work, and a Job Safety Analysis (JSA) or Integrated Work Control Package (IWCP) for non-routine work.

5.2.10 Respiratory protection shall be recommended for all priority 1 operations.

5.2.11 IH shall conduct periodic reviews of the adequacy of controls listed above. This review shall be accomplished in the following manner:

1. Collect air and/or surface samples for beryllium.
2. Conduct inspections of Beryllium Regulated Areas.
3. Periodically walk through the Beryllium Regulated Areas.

5.2.12 IH shall recommend other work control practices as necessary. This shall be based upon the findings obtained in step 5.2.11.

5.3 Types of Beryllium Samples

5.3.1 Breathing Zone Air Samples

5.3.1.1 All breathing zone air samples shall be collected and reported in accordance with IH procedure 4-15310-IHPM-2.2, Industrial Hygiene Air Sampling.

5.3.1.2 The frequency in which breathing zone air samples are collected shall be in accordance with the following sampling strategy:

NOTE

If the operation is not being conducted at the point in which sample collection should occur, a note shall be made to the file indicating this fact and the operation will be sampled the next time it occurs.

1. Priority 1 operations shall be sampled monthly once a baseline has been established.

2. Priority 2 operations shall be sampled semiannually once a baseline has been established.
3. Priority 3 operations shall be sampled annually once a baseline has been established.
4. Priority 4 operations shall be sampled to establish a baseline. No further sampling is required unless the process changes.

5.3.2 Area Air Samples

5.3.2.1 All area air samples, except airhead samples, shall be collected and documented in accordance with IH procedure 4-15310-IHPM-2.2, Industrial Hygiene Air Sampling.

5.3.2.2 The frequency in which area air samples are collected, except for airhead samples, shall be on an as needed basis.

5.3.2.3 Airhead samples are collected by placing a Whatman 41 filter on a stationary vacuum source which is located near a process which has potential for producing beryllium particles.

5.3.2.4 The frequency in which airhead samples are collected may vary from daily to weekly to monthly, depending upon the location and activity level within the area.

5.3.2.5 The Beryllium Control Program Administrator shall maintain an up-to-date listing of each airhead sample location and frequency of collection.

5.3.2.6 As the airhead samples are collected they shall be packaged in a manner that will prevent any cross contamination between samples.

5.3.2.7 The container in which the samples are packaged for submittal to the laboratory shall have a tamper proof seal placed over the opening.

5.3.2.8 The airhead samples shall be maintained under chain of custody from the point of collection.

5.3.2.9 The airhead samples shall be submitted to the HS&E Laboratory in Building 123 for analysis.

5.3.2.10 All airhead sample data shall be entered into a beryllium sample log book.

5.3.2.11 The vacuum system with which the air samples are collected shall be calibrated monthly, to ensure that the sampling rate is 50 liters per minute.

5.3.3 Smear Samples

5.3.3.1 Smear samples are collected by smearing a Whatman 41 filter across a surface area of 1 ft^2.

5.3.3.2 Whenever a surface area of 1 ft^2 cannot be smeared, the size of the surface area shall be estimated and noted on the sample form.

5.3.3.3 The frequency in which smear samples are collected may vary from daily to weekly to monthly, depending upon the location and activity level within the area.

5.3.3.4 The Beryllium Control Program Administrator shall maintain an up-to-date listing of each smear sample location and frequency of collection.

5.3.3.6 As smear samples are collected they shall be folded in half, with the potentially contaminated side in, to ensure that part of the sample is not transferred to the interior of the glassine bag.

5.3.3.6 The collected smear samples are placed in glassine bags to minimize the potential for cross contamination.

5.3.3.7 The Beryllium Control Program Administrator shall determine which smear samples shall be analyzed on the BeAST and which ones shall be submitted the HS&E Lab for analysis.

5.3.3.8 The container in which the smear samples are packaged for submittal to the laboratory shall have a tamper proof seal placed over the opening.

5.3.3.9 The smear samples shall be maintained under chain of custody from the point of collection.

5.3.3.10 All smear sample data shall be entered into a beryllium sample log book.

6. RECORDS

6.1 The following documents must be accurately completed and maintained for proper documentation of the Beryllium Control Program:

6.1.1 All records identified within IH procedure 4-15310-IHPM-2.2, Industrial Hygiene Air Sampling.

6.1.2 All letters documenting employee concerns.

6.1.3 All letters documenting changes made to the Beryllium Control Program.

6.1.4 All laboratory reports received from the HS&E Lab.

6.1.5 All beryllium sample log books.

6.1.6 The airhead vacuum system calibration records.

6.1.7 The Beryllium Operations Inventory and Beryllium Support Operations Inventory.

6.1.8 The BeAST calibration records

6.1.9 Ventilation measurement records as dictated in IH procedure 4-15310-IHPM-4.3, Ventilation Control.

6.2 All documents identified in 6.1 shall be maintained in accordance with 4-15310-IHPM-1.3.

7. REFERENCES

7.1 DOE Order 5480.10

7.2 1-15310-HSP-13.03, Carcinogen Control

7.3 1-15310-HSP-13.04, Beryllium Protection

7.4 4-15310-IHPM-1.3, Records Management

7.5 4-15310-IHPM-1.6, Industrial Hygiene Report Formats

7.6 4-15310-IHPM-2.2, Industrial Hygiene Air Sampling

7.7 4-15310-IHPM-3.1, Industrial Hygiene Process Review Form

7.8 4-15310-IHPM-3.3, Industrial Hygiene Employee Notification Form

7.9 4-15310-IHPM-3.6, Safety and Hygiene Chain of Custody Record and Analysis Request Form

7.10 4-15310-IHPM-4.3, Ventilation Control

7.11 4-15310-IHPM-8.11, Hazard Inventory

7.12 29 CFR 1910.1000